

## **Defense Advanced Research Projects Agency (DARPA) Strategic Technology Office**

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Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>MAR 2009</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2009 to 00-00-2009</b>	
4. TITLE AND SUBTITLE <b>Defense Advanced Research Projects Agency (DARPA) Strategic Technology Office</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Defense Advanced Research Projects Agency (DARPA), Strategic Technology Office, 3701 North Fairfax Drive, Arlington, VA, 22203</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>MTO (DARPA Microsystems Technology Office) Symposium, 2009, Mar 2-5, San Jose, CA</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>14</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



# DARPA's Mission



DARPA's mission is to maintain the technological superiority of the U.S. military and prevent technological surprise from harming our national security by sponsoring revolutionary, high-payoff research that **bridges the gap between fundamental discoveries and their military use.**





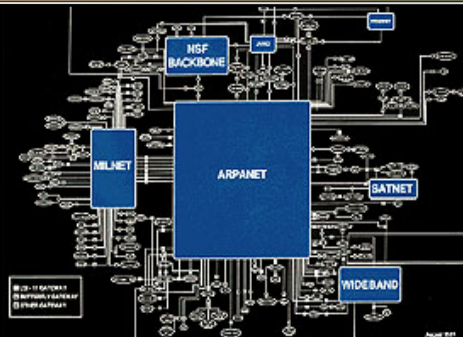
**"The Science of Today is the  
Technology of Tomorrow"**

*- Edward Teller*



**"STO Technology of Today  
Enables the Future"**

*- STO Management*



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# Strategic Areas of Investment







# Strategic Areas of Investment



**ENERGY**

**SPACE & NEAR SPACE**

**WARFARE**

**ISR**

**MEDICAL**

**CYBER NETWORKS**

**AUSTERE ENVIRONMENTS**



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# Characteristics of a DARPA Program



- ☐ ***Revolutionary change*** in defense capability  
(not extensions or incremental gains)
- ☐ Empowered by ideas and passion of the ***program manager***
- ☐ ***Project centric*** – not investigator centric
- ☐ Creates opportunities, “encourages” ***teams*** – evaluated by Government
- ☐ ***Flexible, rapid review*** and contracting
- ☐ ***Actively managed*** by the program manager
- ☐ Driven by ***quantitative milestones*** leading to a Memorandum of Agreement (MOA) when possible



# Strategic Areas of Investment



## CYBER /STRATEGIC AND TACTICAL NETWORKS

Network centric operations are the cornerstone of modern operations and they require reliable, available, survivable networks. Information is a key enabler in ensuring U.S. forces a dominant position in military operations.



### PORTFOLIO

- National Cyber Range
- Dynamic Quarantine of Computer-Based Worm Attacks
- Connectionless Networking
- Optical RF Communications Adjunct
- Scalable Network Monitoring
- Wireless Network after Next
- Wolfpack

### AREAS OF INTEREST

- **Reliable, robust, continuous connectivity**
- **Fast transport**
  - Surface and subsurface
- **Information superiority**
  - The network as a weapon
- **Defend the network**
  - Guarantee connectivity and survivability



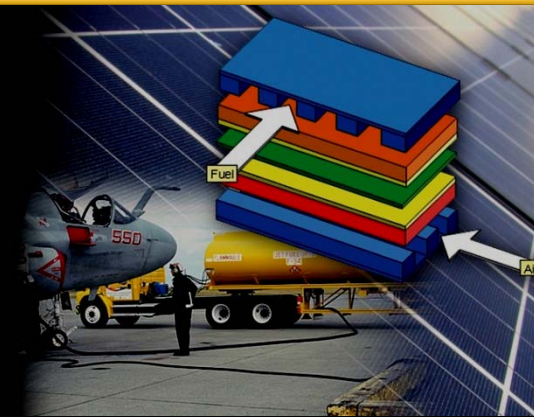


# Strategic Areas of Investment



## ENERGY

*New sources of energy and more efficient and effective uses of existing energy is a critical challenge for the United States and Department of Defense. It is an important component of all strategic and tactical operations.*



## PORTFOLIO

- BioFuels (JP-8)
- Coal to Liquid
- Fuel Cells
- Fixed Grid Energy Systems

## AREAS OF INTEREST

### Deployable Energy Network

#### Storage

- Harvesting/conversion
- Control

#### Smart Systems

- Energy Technology meets Information Technology

#### Distribution

- Wireless
- Superconducting

#### Energy Conversion

- Geothermal
- Waste



# Strategic Areas of Investment



## BIOLOGICAL AND HEALTH APPLICATIONS

Counter emerging biological, environmental and health threats. Develop health and medical technology, infrastructure and other health capacity building instruments to enable and enhance rapid, sustainable and minimal logistics-requiring operations in an austere or functionally-austere (one which for geopolitical or war-fighting or disaster response reasons is functionally austere) environments.



## PORTFOLIO

- Radiation Biodosmetry
- Stand Off Triage
- Breath Diagnostics

## AREAS OF INTEREST

Stand Off Triage

Stand Off Soldier Health Monitoring

Stand Off Soldier Care

Survival Pack

- 24 hour
- Extended

In-field Medic Test Diagnostics

Broad Spectrum Hazard Indicators





# Strategic Areas of Investment



## SUSTAINMENT IN AUSTERE ENVIRONMENTS

Meet expeditionary force need to effectively operate in deserts, mountains and high latitude regions that severely restricts key military capabilities. Develop capabilities not only benefit US forces but have significant benefits for disaster relief, initially supporting civilian functions.



### AREAS OF INTEREST

- Infrastructure in a Box
- Feels Like Sea Level
  - maintain physiology as though you were at sea-level maintain effective oxygen volume
- Operational Supremacy in Extreme Environments
- Dense Nutrition Supplements
- Water Harvesting (Potable/Scale)
- Anti-Icing
- Deep Sea



# Strategic Areas of Investment



## WARFARE: CONVENTIONAL AND IRREGULAR

Forces face asymmetric forces operating in complex terrain who capitalize on the intrinsic benefits of mass, popular support and the defense. Conventional warfare is less likely but the most dangerous. In all areas, but especially in this warfare area need to look for manufacturing processes for new technologies or existing that are faster, cheaper, adaptive, portable and provide manufacturing flexibility and independence.



### PORTFOLIO

- Advanced Sensing Technologies
- Vision Systems
- Next Generation Communications
- Underground Structures

### AREAS OF INTEREST

- Portable Manufacturing
- AT/Temper Resistant Expendable Technology
- Develop a universal, symbol-based command and control system
- Revolutionary Force Projection





# Strategic Areas of Investment



## GLOBAL ISR AND NATIONAL DEFENSE

Defending United States territory and forces. Provide the ability to detect threats and support offensive strikes around the world. Develop capabilities to detect and counter Chemical, Biological, Radiological, and Nuclear (CBRN) threats. Exploit the inherent capabilities and vulnerabilities of deep sea operations.



## PORTFOLIO

- Low Altitude Airborne Sensor System
- ISIS
- Sub-Surface Navigation
- Seismic and Acoustic Imaging

## AREAS OF INTEREST

**Standoff detection of weapons, explosives, chem/bio/nuclear**

### *Technical Challenges:*

- Identification of observable characteristics
- Highly cluttered environment
- Historical correlations to create an acceptable false alarm rate
- Signal attenuation and dispersion (physics limitations)



# Strategic Areas of Investment



## SPACE & NEAR-SPACE SENSORS & STRUCTURES

Space is an operational domain, with space and near space remain the strategic high ground of all operations. Command and control, communications, ISR, targeting and other decisive functions depend on it.



### PORTFOLIO

- ISIS
- Large Area Coverage Optical Search
- Multifunctional Electro-Optics
- Multipath Exploitation Radar
- Quantum Sensors
- Symbiotic Communications

### AREAS OF INTEREST

- Continuous, reliable, stand-off tracking of air and ground moving targets, day or night
- Seek and engage tracked targets
- Battle Damage Assessment





# What's Next?

